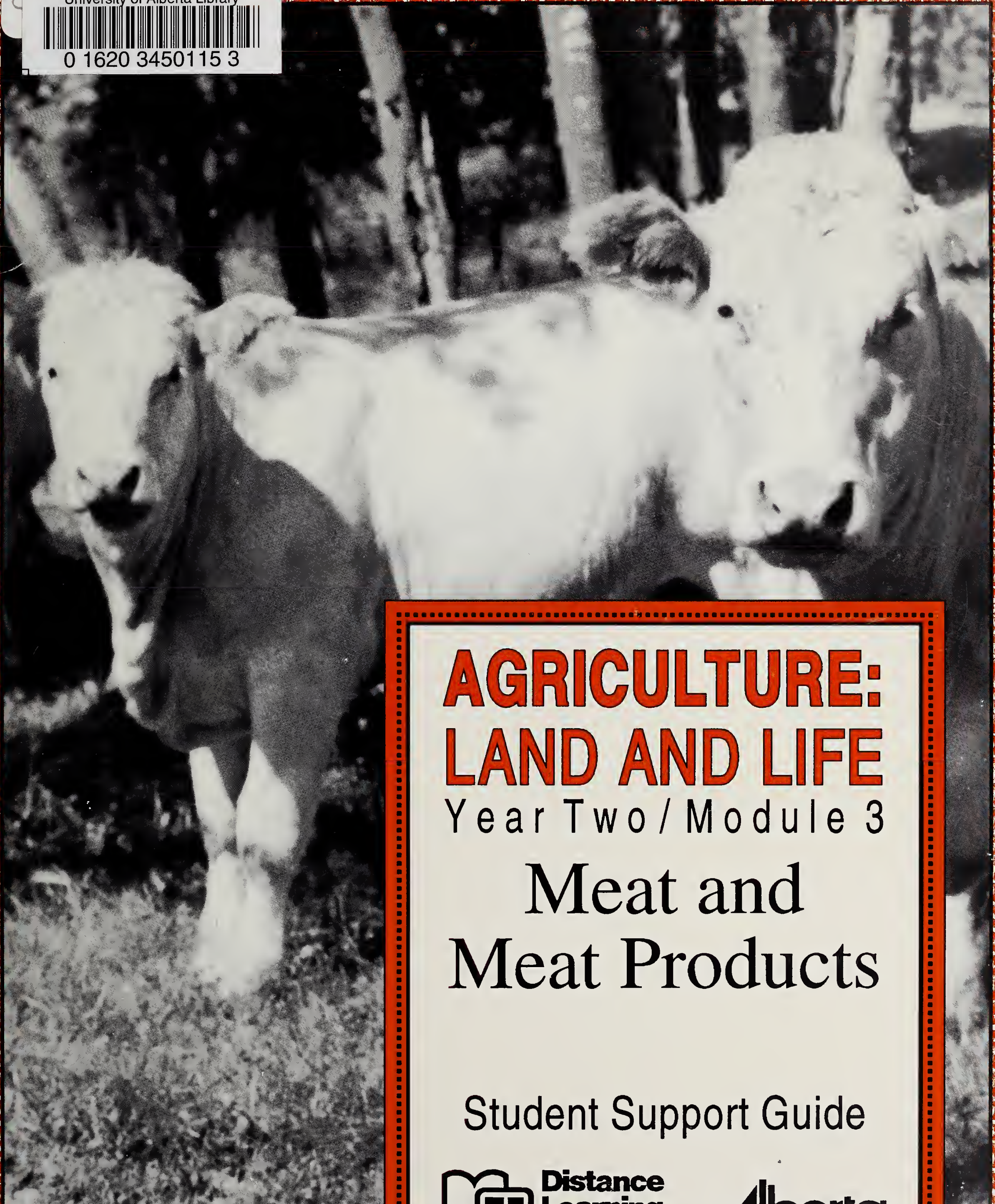
AL.2.1992-485
University of Alberta Library
0 1620 3450115 3



AGRICULTURE: LAND AND LIFE

Year Two / Module 3

Meat and Meat Products

Student Support Guide

Distance Learning

Alberta
EDUCATION

Agriculture: Land and Life Year Two

Module 3

STUDENT SUPPORT GUIDE

Distance Learning

Alberta
EDUCATION

Note to the Parent or Guardian

This Student Support Guide contains answers to activities in the Module Booklets. It should be kept secure by the parent or guardian if the student is under 16 years of age. Younger students should not have access to this Guide except under supervision.

This Student Support Guide does not contain the answers to the Assignment Booklets. The Assignment Booklets will be graded by the student's distance education teacher.

Agriculture: Land and Life Year Two
Student Support Guide
Module 3
Meat and Meat Products
Alberta Distance Learning Centre
ISBN No. 0-7741-0488-0

ALL RIGHTS RESERVED

Copyright © 1992, the Crown in Right of Alberta, as represented by the Minister of Education, Alberta Education, 11160 Jasper Avenue, Edmonton, Alberta, T5K 0L2.
All rights reserved. Additional copies may be obtained from the Learning Resources Distributing Centre.

No part of this courseware may be reproduced in any form, including photocopying (unless otherwise indicated), without the written permission of Alberta Education.

Every effort has been made both to provide proper acknowledgement of the original source and to comply with copyright law. If cases are identified where this has not been done, please notify Alberta Education so appropriate corrective action can be taken.

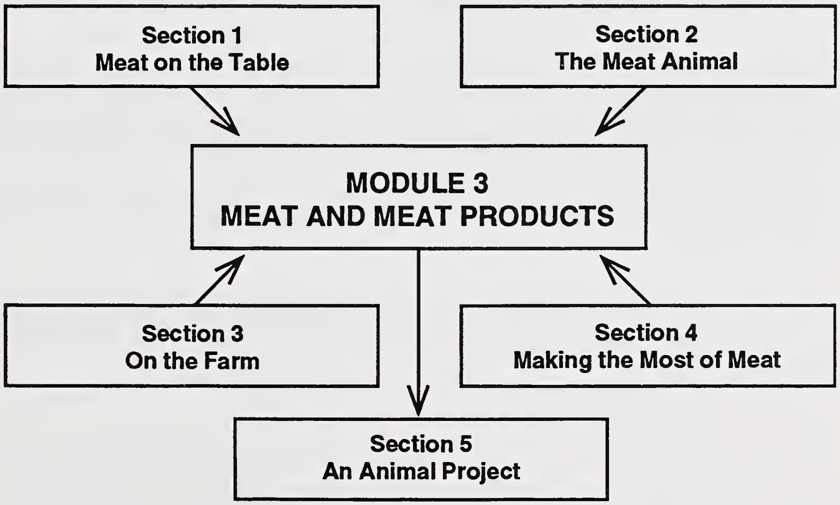
UNIVERSITY LIBRARY
UNIVERSITY OF ALBERTA

Module 3: Meat and Meat Products – Overview

This module uses a case study approach. The intent of this module is to provide a practical examination of production, processing, and marketing aspects of a particular agricultural industry. The theme is similar to the one used in Module 1: Year One of the program; however, the consumer emphasis has been replaced by an emphasis on nutrition.

In this module students will

- discover the nutritional value of meats and alternate foods
- investigate why people eat meat and what they like about meat
- consider the important aspects of caring for livestock
- visit several farms to see how meat animals are raised
- follow the many paths of meat from the farm to the table
- examine the wide range of products made from meat animals
- consider some of the controversial issues involving meats and modern methods of livestock rearing



Evaluation

The student's successful completion of all assignments in the Assignmnt Booklet will depend on practice obtained while doing the various activities in the Student Module Booklet. In this module students are expected to complete four section assignments.

The following distribution of marks will determine the student's grading for this module.

Section 1 Assignment	**25 marks**
Section 2 Assignment	**25 marks**
Section 3 Assignment	**26 marks**
Section 4 Assignment	**24 marks**
TOTAL	**100 marks**

Note: The evaluation of the assignments for this module does not include an evaluation of Section 5: An Animal Project. The project is to be evaluated as part of Module 4.

Each module for the Agriculture: Land and Life Year Two course is worth 25% of the total final grade, based on an equal weighting of the four modules in this course.

Project Work

If this is the first year that the student is in the Agriculture: Land and Life program, then the student does not need to complete Section 5: An Animal Project. Instead, Part A of Module 4: What Is Agriculture? will need to be completed.

If the student has previously taken Year One of the Agriculture: Land and Life program, then he or she has an opportunity to pursue an interest in particular topics during the Year Two program. Students are expected to complete two individual projects as part of the requirements for this course. Descriptions for a plant project (Project 1) are included as part of Module 2, and descriptions for an animal project (Project 2) are included as part of this module. Approximately 7.5 hours are allowed for the book work for each project. The actual time spent pursuing each of the projects will be more than 7.5 hours.

In Section 5 of the module booklet, students will find instructions on how to complete an animal project of their choice. A report of their project wil be submitted in the Module 4 Assignment Booklet, Part B.

There are 50 marks for the animal project. The following is a breakdown of marks for the animal project assignments that are to be submitted with the Module 4 Assignment Booklet, Part B.

Assignment	Value
Project 2: Section 1	5
Project 2: Section 2	5
Project 2: Section 3	10
Project 2: Section 4	15
Project 2: Section 5	10
Project 2: Section 6	5
TOTAL MARK	50

Materials Needed for Module 3

Most of the materials needed for Module 3 can be obtained when students are ready to do an activity. However, in order to assist students effectively in their study of this course, it may be helpful to preview Module 3. This will give you an idea as to how the topics are developed; it will also give you an overview of the material needed in the module. In some cases, if the materials suggested are not readily available, the learning facilitator may be able to substitute suitable materials for the student so that the activities can be completed successfully.

Media

The videotape resources for this module may be available from the Alberta Distance Learning Centre, or call your local school authorities.

The following two video programs are suggested if students are to use the optional media pathways in Module 3:

- *The Sun Changers*, VHS videotape, 10 min.
- *Cattle Option*, VHS videotape, 16 min.

Section 1: Meat on the Table

The emphasis of this section is on the nutritional value of meats. Although answers may vary for some activities, students should be able to discuss the nutritional value of meats and appreciate how consumer needs and preferences influence the production, processing, and marketing of meat products.

Section 1: Activity 1

1. What are your favourite meats?

   Answers will vary.

2. How do you like them prepared?

   Answers will vary.

3. In the following space list some characteristics of meat dishes that aid you in telling them apart?

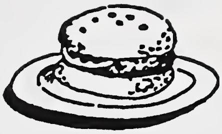
   Answers will vary. They may include the following:

   - *colour: Meats can be light, dark, or coloured artificially with ingredients in a recipe.*
   - *taste: Meat from different animals has a distinct flavour that you learn to recognize. It adds flavour to many recipes.*
   - *texture: Different meat cuts have textures that people can identify. You would never confuse a hamburger with a steak, even though both may be from the same part of the animal.*
   - *smell: A cooked meat or meat recipe can produce odours that you recognize long before the meat reaches the table.*
   - *preparation: Different recipes require special cuts of meat. Pork ribs, for instance, are often prepared with a sweet-and-sour sauce.*

4. Circle your favourite food in the following pictures.

Stew

Steak



Hamburger

Pork Chops

Hot Dog

Fried Chicken

Spaghetti & Meatballs

Beef Liver

Roast

Answers will vary.

5. Use the headings in the following chart and try to describe the food that you have circled, as in the example.

Colour	Taste	Texture	Smell	Preparation	Food
brown	spicy	tender	charred	barbecued	barbecued steak

Let a partner (a friend, brother, sister, parent, etc.) try to guess your favourite food. Change places. Try to guess your partner's favourite meat dish. Then try another food if you would like to.

Answers will vary. Students should work with a partner for this activity to help identify descriptive words.

6. Which of the following meats would represent a tender cut? Rate the following as 1 – more tender, or 2 – less tender.

Cut	Part of the Animal	Your Rating
sirloin steak	back of a beef animal	*1*
pork chop	back of a hog	*1*
tenderloin	long muscle beside backbone	*1*
ribs	enclose lungs and organs	*2*
leg of mutton	leg of a sheep	*2*
lamb riblets	front portion of the flank	*2*
veal cutlet	upper back leg of calf	*2*
rabbit leg	legs	*2*
chicken breast	breast	*1*

The answers are also included in the Appendix of the Student Module Booklet.

7. Decide on the best cooking method for each of the following cuts of meat. If you are not sure which part of the animal the cut comes from, turn to the Appendix diagrams.

Cut of Meat	Moist or Dry Heat	Describe Your Favourite Cooking Method
prime rib roast	*dry*	*roast or barbecue*
sausage	*usually dry*	*fry*
sirloin steak	*dry*	*broil, barbecue*
chicken breast	*moist or dry*	*stew, braise, broil, fry, or barbecue*
round steak	*moist*	*braise, stew, or pulverize and stir fry*
pork chops	*moist or dry*	*almost any method is used*
chuck steak	*moist*	*braise, stew*
lamb chop	*dry*	*fry, broil, barbecue*
leg of lamb	*dry*	*roast (lambs are young)*
veal cutlet	*moist*	*braise or stir fry*
chicken wings	*moist or dry*	*stew, broil, fry, or barbecue*

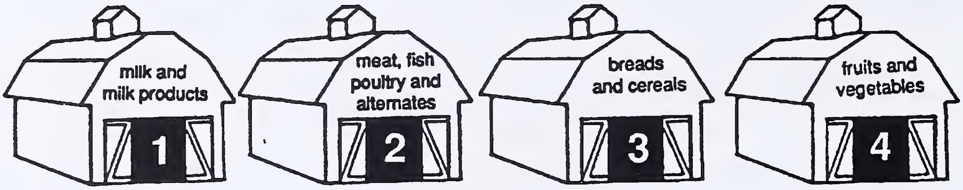
Note: There may be other answers possible here. For example, if a student comes from a culture outside of North America, he or she may possibly use different methods than those stated in the chart.

The answers are also included in the Appendix of the Student Module Booklet.

Section 1: Activity 2

1. Do you know your food groups?

Which Food Group?



Each food listed below fits into one or more of the four food groups. Put the correct number or numbers beside each food to show which food group or groups it belongs to.

bread	3	ice cream	1	turkey	2	lettuce	4
potato	4	meat loaf	2	dried beans	2	tuna	2
muffin	3	corn cereal	3	rice	3	liver	2
eggs	2	beef stew	2, 4	hot dog	2, 3	cheese	1
pizza	3, 1	hamburger	2	apple	4	spaghetti	3
roast	2	yogurt	1	steak	2	grapes	4

[1]

The answers are also included in the Appendix of the Student Module Booklet.

Check student responses for this activity. If students had trouble with this activity, they should carefully review the information on the four main food groups contained in the Student Module Booklet. Students should then complete Canada's Food Guide Scorecard in question 2 for foods eaten during one day, and examine the scorecard at the end of the day.

---

[1] Beef Information Centre, Toronto, Ontario, for the material from *Canada is Cattle Country*. Adapted by permission of the Beef Information Centre, Toronto, Ontario.

2. Use the examples from the previous page as a guide to complete the following Food Guide Scorecard for the food you eat during one day.

   In the daily scorecard the dark boxes represent the minimum recommended number of servings. The lighter boxes represent optional additional servings. Foods high in sugar and fats, or of little nutritive value, are placed under Additional Foods and Beverages.

   For each food that you eat today, shade in the appropriate box in the chart. Make use of the following examples:

   - For a slice of toast shade in one box of the breads and cereals group.
   - For one egg shade one-half box of the meats group.
   - For combination foods score each ingredient in the following way; for one serving of cereal with milk, shade in one box of the cereal group and one box of the milk group.
   - For fruits and vegetables shade in the appropriate box for each serving, but add an F to the shaded boxes that represent fruit servings and a V to the shaded boxes that represent vegetable servings.

FOOD GUIDE SCORECARD

Fruits and Vegetables 4 to 5 servings					
Breads and Cereals 3 to 5 servings					
Milk and Milk Products 3 to 4 servings					
Meat, Fish, Poultry & Alternates 2 servings					
Additional Foods and Beverages					

Discuss student scorecards. The best scores would show all of the dark squares shaded and at least two servings of fruits and two servings of vegetables. Any dark square not filled in means students are missing a source of essential nutrients. Ask students to identify the missing nutrient and how they can increase their intake of it.

3. Try to balance the following menus using a variety of meat and alternate proteins so that a meat eater, a non-meat eater, and a complete vegetarian all receive their required daily servings of complete proteins. Assume all of their daily protein requirements are obtained in one meal. Monday's menu has been done for you.

   Canada's Food Guide recommends two servings of meat or alternates each day.

   Note: Use Table 1: Protein Content of Some Common Foods, located in the Appendix, to find the portion sizes in one serving of various meats and alternate foods.

	Meat Eater	**Non-meat Eater**	**Vegetable Diet**
Monday	pork chop 180 g	2 eggs 60 mL peanut butter	250 mL kidney beans 250 mL brown rice
Tuesday			
Wednesday			
Thursday			
Friday			

Answers to this activity will vary but the following rules should apply:

- *Meat eaters will have two servings per day. They can select from different kinds and cuts of meats.*
- *Non-meat eaters can use alternate animal sources. They will need to choose foods from Breads and Cereals, plus Milk and Milk Products, to obtain a proper supply of complete proteins.*
- *Vegetarians must eat a combination of vegetables to get all of the proteins that they need. They should pair servings according to special rules (simplified in the Student Module Booklet). To obtain the recommended daily supply of complete proteins, vegetarians need to select complementary proteins from a choice of legumes plus cereals, or legumes plus nuts.*

Table 1: Protein Content of Some Common Foods is reproduced from the Appendix for reference to portion sizes in one serving of various foods from the Meat, Fish, Poultry and Alternates group.

TABLE 1 – PROTEIN CONTENT OF SOME COMMON FOODS

(Each quantity represents one serving)

Food		Portion Size	Weight (g)	Protein (g)
Meats	steak – lean		90	26
	ground beef	1 pattie	90	24
	beef liver	1 piece	90	23
	pork chop	1 chop	90	23
	pork sausage	4 links	60	12
	wieners	2	90	10
	lamb	1 chop	90	25
	chicken	2 drumsticks	90	25
	moose		90	31
	codfish	1 fillet	90	25
Dairy	whole milk	250 mL	125	8
	cheddar cheese		45	11
	eggs	2	90	12
Legumes (bean crops)	soybeans	250 mL	90	21
	kidney beans	250 mL	195	15
	lima beans	250 mL	200	15
	green peas	250 mL	169	8
Nuts	peanut butter	60 mL	60	20
Cereals	whole wheat bread	2 slices	50	2
	brown rice	250 mL	180	5
	breakfast cereals		100 (avg.)	3

[1]

4. Based on the exercise just completed, identify two advantages of using meat as a protein source

Meat is a convenient source of complete proteins. Meats can be used to give variety to your diet. They are also good sources of vitamin B and iron. A specific quantity of meat contains more proteins than the same quantity of vegetables.

---

[1] Health and Welfare Canada for the data from *Nutrient Value of Some Common Foods*, Health and Welfare Canada. Revised 1987. Adapted by permission of the Minister of Supply and Services, Canada.

5. Circle the best method for each person in the following situations to solve their individual problems. Think carefully about your answer in each case so that you are able to explain to your learning facilitator why your choice is best.

   a. Mary wants to look good in her bathing suit this summer. Should she

      i. go on a crash diet and skip meals

      This is not a good idea. Crash diets often omit essential foods while substituting easily consumed fast foods.

      ii. go on a vegetarian diet

      Vegetarian diets are difficult to manage. It is also difficult to obtain necessary vitamins and proteins.

      iii. buy a new bathing suit

      Buying a new bathing suit is a good idea (but this may not be enough).

      iv. [✓ reduce portions of food, maintain a balanced diet, and eliminate snacks]

      This is the best solution.

      v. keep eating as usual but exercise more

      This is a good idea for toning her body.

   b. Roger is preparing for a track and field meet. As part of his training, he should

      i. [✓ have a balanced diet but increase total calories to make up for his increased activity]

      This is the best choice.

      ii. eat high energy food like chocolate cake before competing

      Many athletes use this approach. The trick is not to overdo it!

      iii. eat an extra snack before bedtime

      Bedtime is a bad time to eat a lot of food, because you will be inactive for seven or eight hours.

      iv. lose weight; extra pounds slow you down

      The right kind of weight does not slow you down. People who exercise have larger muscles and less excess fat than those people who do not exercise. Dieting is not recommended for an active athlete.

c. Tom's dad is overweight. Circle the things in the following list that his dad might do to lose weight:

• fry steak	broil steak
• eat roast beef with gravy	[✓ eat roast beef without gravy]
[✓ • trim fat before cooking]	cook meat with the fat still on it
• eat broccoli and cheese sauce	[✓ eat broccoli and lemon sauce]
[✓ • have yogurt for dessert]	have ice cream and cake for dessert

6. If many people seek to lower their intake of fat and cholesterol by eliminating meat from their diets, how should meat producers respond?

Health concerns may prompt consumers to reduce their meat consumption. This will not be good for people who produce, process, and market livestock. But if the preference for lean meat continues, producers will adjust and give consumers the products they demand.

7. Find the best source of each of the following:

	Meat Source	**A Vegetable Source**
Iron	*beef liver*	*kidney beans*
B vitamins	*beef liver, lamb, chicken, or pork chops*	*peanuts, kidney beans*
Thiamine	*beef liver, pork chops, or lamb*	*peanuts, kidney beans*
Niacin	*beef liver, chicken, or pork chops*	*peanuts*
Riboflavin	*lamb*	*spinach, broccoli*
Vitamin A	*beef liver*	*spinach, broccoli*

Compare student answers with those in the table. Please note that the B vitamins include Thiamine, Niacin, and Riboflavin.

8. Why is it important to balance your diet by eating a variety of foods?

   Each food makes its own contribution to nutrition. By having a balanced diet you are assured of getting all of the nutrients that you need. Omitting or lowering your intake of any food group carries with it the risk of malnutrition.

Section 1: Activity 3

Students are to do Part A or Part B.

Part A

Find the prices of each of the following items at your local meat market or grocery store. Explain the price differences in each group.

	Price/100 grams	How do you explain this difference?
Group I		
sirloin steak	*Prices will vary.*	*You pay extra for tender prime cuts of meat that have no greater food value than less expensive cuts. Cheaper cuts of beef can be ground up to produce a versatile low-cost meat.*
round steak		
lean ground beef		
Group II		
fresh chicken	*Prices will vary.*	*Fresh chickens are ready to cook, but they do not stay fresh! This is a convenience that costs. Fresh chickens are also produced on a smaller scale than frozen chickens. The value of chicken nuggets is increased by the cost of processing, and the removal of waste.*
frozen chicken		
chicken nuggets		

Part B

1. Imagine that you have $100 to spend on groceries for your family this week. Thirty percent of this amount (or $30) will go for meat. You will need about 500 grams of meat for each meal and perhaps some processed meats for lunches, etc. See how far your money will go in the local supermarket.

	Meat	Cost/100 grams	Amount	Total Cost
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				
Saturday				
Sunday				
			Total Cost for the Week	

Answers will vary. Be aware that some students may see this as an impossible task!

2. How could your family obtain the same nutrition from meats but spend less money?

Your family could buy cheaper cuts of meat and use moist cooking methods to improve tenderness.

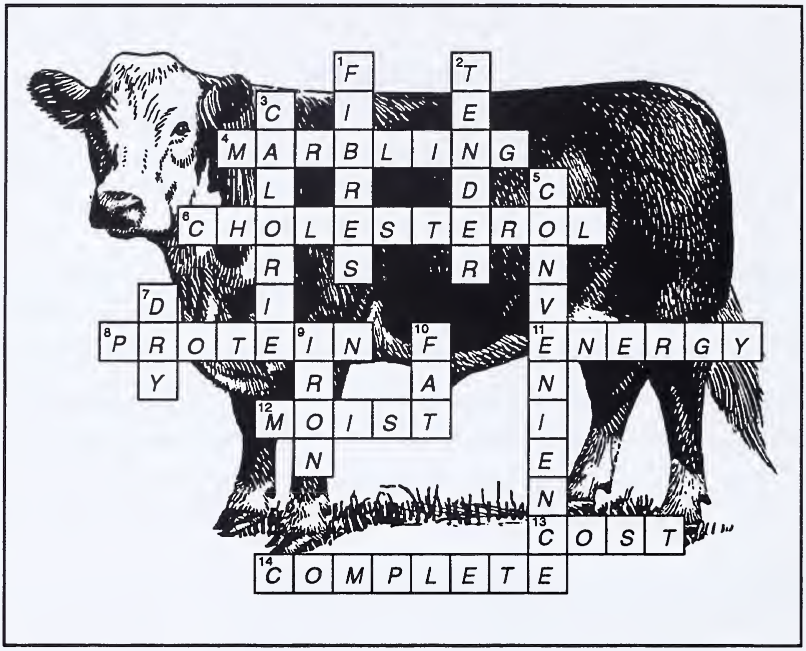
Section 1: Follow-up Activities

Encourage students who are having difficulty with this section to complete Part A and Part B of Extra Help. Part A involves reading a summary of Section 1 and Part B involves completing a crossword puzzle as a review of the section. Other students may complete one or more of the Enrichment activities. All students should complete at least one Enrichment activity.

Extra Help

Complete the following crossword puzzle as a review of this section.

A PUZZLE ON THE HOOF



Word List

tender
fat
dry
cholesterol
energy
fibres
convenience
protein
iron
moist
calorie
marbling
cost
complete

Across Clues

4. This describes the streaks of fat that run through lean meat.
6. This substance, created from fats, has been linked to heart disease.
8. For most people meat is the main source of this nutrient.
11. This is required to power peoples' activities, much like the gas in a car.
12. This method of cooking is used for less tender meats.
13. This is an important consumer consideration when buying meats.
14. This type of protein (found in meats) contains all of the amino acids needed by the human body.

Down Clues

1. Muscle tissues are bound together by two types of connective __________.
2. The better cuts of meat are valued by consumers because they are __________.
3. This unit is often used to compare the food energy found in various foods.
5. Consumers are looking for this to make life easier, but it often means they will pay more.
7. This method of cooking is best for tender cuts of meat.
9. Red meats and liver are an excellent source of this nutrient.
10. This is the most concentrated form of food energy used by the body.

Enrichment

Enrichment A

1. Obtain a calorie counter food chart from a health food store or health clinic. Some cookbooks also have tables in the appendix. List all of the foods that you eat for one week and write the approximate number of calories contributed by each food in your diet. At the end of the week find

   - the total calories each day
   - the total calories for the week
   - the total calories from meat and meat products
   - the average number of calories consumed per day

   The table at the end of Enrichment A is supplied to help you record this information.

Check to see that the chart, MY FOOD INTAKE at the end of Enrichment A in the Student Module Booklet, has been completed. Discuss the survey results and the answers to questions 2 to 5 with the students.

2. At which meal do you consume the most energy?

   Most students will answer that they consume the most energy at the evening meal.

3. Are you consuming more than 2500 calories each day?

   Answers will vary. Compare answers to the information students gave in the chart under the column "Total calories for each day."

Note: This is not necessarily a problem if you are very active or if you are a person with high metabolism; that is, you use more than an average amount of energy just for growth and normal activity.

4. How important is meat in your diet? Add up the total number of calories from meat and equivalent foods and compare them with the total calories for the week.

   Answers will vary.

5. List the other foods you eat that contain fats.

   These foods include pastries and baked desserts, dairy products, chocolate, nuts, and vegetable oils.

Students should not attempt to change their diets based on this survey. If they have concerns, they should talk about them with their doctor, nutritionist, or home economist.

Enrichment B

Prepare one of the meat recipes included in the Appendix or use another recipe. Think about how your method of cooking takes into consideration the quality of meat you are using.

Note: Do this activity under the supervision of your learning facilitator.

Students may ask you to sample their cooking, and discuss with you how their recipes take into consideration the quality of meat they are using.

Enrichment C

Research and write a report on an unusual animal that is raised for meat. Encyclopedias or nature magazines may provide you with information.

Investigate to find out

- where the animal is raised
- where it is consumed
- how it is prepared to be eaten by humans
- the value of the animal as a meat animal

Include any nutritional information that you discover.

Students may wish to discuss their report with their learning facilitator and make a presentation to their family, or to other agriculture students.

Note: The student should not complete the assignment for Section 1 in the Module 3 Assignment Booklet. A choice is incorporated into this assignment to accommodate students who prefer to answer questions on alternatives to meat instead of on meat products. Both parts of the assignment require an examination of the same factors which affect consumer demand for meat products.

Section 2: The Meat Animal

The purpose of this section is to acquaint students with basic information about the selection and care of farm animals. Selection, proper nutrition, and health are important for the production of quality meats from livestock.

Section 2: Activity 1

1. Do you have a pet? If so, describe your pet and mention some of the things that it does for you. What must you do for it?

   Answers as to why people have pets and what pets do for their owners will vary. Pets must be cared for. People feed, water, and usually exercise their pets. They also provide health care, pick up wastes, and spend spare time with their pets. Most importantly, pets and people have an emotional attachment.

2. Think about Susan's 4-H calf. What special care did it receive? How are farm animals different than pets?

   Susan carefully fed her calf with a proper diet, provided proper health care, and groomed and trained her calf. But there are differences between pets and farm animals. Although people also feed, water, and occasionally exercise farm animals, along with providing health care and waste pick-up, the hours that people and their farm animals spend together are purposeful working hours. The relationship is businesslike and friendly. There is less emotional attachment of the type people have for their pets.

3. Make up some rules that you think might apply to taking care of farm animals.

   Answers will vary. Students can compare their rules with the following rules that have been included in the Appendix of the module booklet:

   - *Freedom from malnutrition.*
   - *Freedom from thermal or physical discomfort.*
   - *Freedom from injury and disease.*
   - *Freedom to express normal social behaviour.*
   - *Freedom from fear.*

Compare these guidelines and rules made up by students. Discuss any differences of opinion.

Section 2: Activity 2

Students can obtain answers to question 1 in one of two ways:

- **They may watch the videotape titled, *The Sun Changers*.**
- **They may read the information in the Student Module Booklet which outlines what all ruminants have in common.**

1. Which of the following animals are ruminants? Put a ✔ by any that you know are ruminants.

   The animals marked with a ✔ are ruminants. The rest are nonruminant plant eaters.

   Milk cow ✔
   Chicken
   Deer ✔
   Hog
   Mouse
   Horse
   Moose ✔
   Sheep ✔
   Rabbit
   Goose

2. If you have a pet at home, you probably also have a book on how to feed and take care of it. If not, select an animal that you would like to have as a pet and read a pet food label to determine what ingredients are in the food.

   Write down the ingredients in your pet's food under the following headings. (If only the percentages are given, write them instead.)

Protein	Fats	Fibre (roughage)	Carbohydrates	Minerals	Vitamins

Answers will vary but all categories should be represented.

3. Many feeds also list the amount of moisture included in them. Why is this?

   Feed is measured in "dry weight." Moisture, which adds weight to feed and must be taken into account, is important to the digestive process.

4. On the following page some feed sources are illustrated. Match each nutrient with a source, much as a farmer does, to produce a balanced diet for each animal.

calf	Proteins	*milk*
	Carbohydrates	*milk*
	Calcium	*milk*
	Vitamins	*milk, injections*
beef cattle	Proteins	*forage crops*
	Carbohydrates	*grain*
	Minerals	*salt, supplements*
	Vitamins	*supplements, injections*
hog	Proteins	*soy meal, field peas*
	Carbohydrates	*grain, corn*
	Minerals	*supplements*
	Vitamins	*injections, supplements*

Section 2: Activity 3

In this activity students are to decide what type of livestock to raise in various different situations that are stated in the Student Module Booklet. This activity is nonstructured to allow students to

- **use their background to arrive at original solutions**
- **consider some of the factors that affect decisions**
- **realize some of the unknowns that must be overcome**

1. What type of animal would you raise?

   Answers will vary, but cattle would be a good choice. The land is well situated for forage crops that require a lot of moisture.

2. What changes would you make to the farm?

   Cattle require a minimum investment in buildings and equipment. Changes could include new fencing, open shelters, corrals, and feed storage. Don't forget that income from baled hay will not be available until the cattle are sold.

3. What type of animal would you raise?

   Answers may vary from exotic animals ranging from elk to ostriches, but sheep are a good choice, because they require similar facilities and feed as do cattle. Lambing occurs at a different time of the year than does calving.

4. What changes would you make to the farm?

   Changes required for sheep are few – open shelter and a barn for lambing will be needed. A different feeding arrangement may be required.

5. What type of animal would you raise?

   Answers will vary. There are many possibilities depending on the amount of time and money that a person has to put into a farm. Horses, sheep, cattle, hogs, poultry, or exotic animals are all possibilities. The cost of facilities and equipment is a major consideration.

6. What changes would you make to the farm?

   Livestock such as hogs and poultry will require indoor housing. There is not necessarily enough land to grow all your feed so some may have to be purchased. Energy costs are also high for indoor housing.

7. What is the main type of farming in the area where you live?

   Answers will vary.

8. Beef livestock production is common in many parts of Alberta. What type of livestock is most common in your area?

   Answers will vary.

9. How is your area suited for producing this type of livestock?

   Answers will vary but should include information about the availability of feed.

Section 2: Activity 4

1. From the three examples given, choose the best dog for the following purposes.

   a. You live in a small home and want an inside dog for company and to serve as a watchdog.

      Poodle

b. You are a hunter and want an outside dog that can flush game birds from the bush and retrieve ducks from the water.

Golden retriever

c. You have a business that requires a guard dog to discourage intruders after hours.

German shepherd

2. Name the cattle which might be crossbred to obtain the following characteristics:

a. a hardy animal with good mothering instincts

Cross *a Hereford* with *a Simmental*.

b. a hardy animal that grows rapidly and produces a lean carcass

Cross *a Hereford* with *a Charolais*.

c. a large animal that will produce lean meat

Cross *a Simmental* with *a Charolais*.

Note: In reality, such crosses may not get the suggested results! Experimentation and careful record keeping are needed to predict which characteristics will be passed on.

3. Solve this problem.

A rancher recently discovered that many of her crossbred cows had udders with very large teats. These teats were too large for newborn calves to suck. How can the problem be corrected, while still using the same crossbreed?

Culling cows with undesirable traits may reduce the frequency of the trait in future generations. It most certainly eliminates the problem for the present!

Section 2: Activity 5

Students are to determine the answer or answers to each of the following questions by circling the correct letter or letters. Discuss these situations and each action with your students. Safety around animals is an important consideration.

1. Trouble may begin at the farm gate. A large, strange, barking dog approaches. What should you do?

   a. Get out of the car and pet it.

   This is a bad idea if you don't know the dog.

   [✓ b.] Drive further and honk your car horn to alert the farmer. Get out only when you are told that it is safe.

   This is the best idea. If no one else is around you would not want to act like an intruder.

   c. Bribe the beast with some meat and run for the door while the dog is busy.

   This is a silly idea! What if the dog can run faster than you?

2. The bull you want to buy is in an outdoor pen. You want a closer look. How can you get closer?

   [✓ a.] Ask the farmer to lead it, with a rope through its nose ring, into a smaller pen.

   This is the recommended way to handle a bull.

   b. Go into the pen but don't turn your back.

   This approach is not advisable. Bulls can move pretty fast, especially if you are not looking.

   c. Ask the farmer to yell and throw stones to get the bull closer to the rail.

   No farmer would intimidate a valuable animal in this way.

3. You are asked to look at a sow with piglets. The sow appears to be ill. She is in an open stall inside the barn. How should you go about "looking" at the sow?

   a. Examine the animal through the slats of the pen using your bare hands.

   This is not a good idea. Unless you disinfect your hands, the sow can transmit diseases to other animals.

   [✓ b.] Leave the animal alone but get its medical history from the farmer.

   An approach of this kind is probably the best and safest idea, especially if you are not a veterinarian.

   c. Go into the pen for a close examination. Remove the piglets to check for infection as well.

   The removal of piglets by a stranger might excite an unrestrained sow.

[✓ d.] If you must examine the pig, use a farrowing pen to restrain it. Examine the source of infection while wearing disposable rubber gloves.

Any veterinarian would consider this to be the best approach.

4. Several cattle are kept in the barn for calving over winter. It is bitterly cold outside. The farmhand thinks there isn't time to clean the barn properly. What should the worker do?

a. Herd the cattle into one side of the pen while cleaning the other side manually, or feed the cattle in one side while cleaning the other.

It is a bad idea to work in a pen with livestock.

[✓ b.] Feed the cattle outside, clean the barn manually, and later herd the animals inside.

This is a better idea.

c. Leave the pen dirty. Clean it next week when the weather is better.

Dirty pens are a safety hazard – this is a worse idea.

Section 2: Follow-Up Activities

Extra Help

Students are to use the words given in a word list in the Student Module Booklet to complete this review.

People have long depended on animals for *meat* and *transportation*. They have also supplied people with such things as *leather*, *wool*, *feathers*, and *manure*. The most important group of farm animals are called *ruminants*.

Nutrition is important for healthy animals, just as it is for humans. Animals obtain their energy from carbohydrates. The nutrients that animals need for growth and reproduction are the *proteins*.

They must also have *water*, *minerals*, and *vitamins*. High protein foods such as *milk* and *soybean* meal are important for young animals. As they mature they consume high carbohydrate cereal grains such as *barley* and *oats*. Roughage from *forage* crops makes up 80% of their diet.

Each *breed* of cattle has certain desirable traits. By *crossbreeding*, a livestock producer can improve the stock by combining the traits of two breeds. To maintain the health of a herd, a producer *culls* animals which show undesirable traits. To protect yourself around large animals, remember that no animal is 100% *reliable*.

Enrichment

Enrichment A

Choose a legume or forage from the previous eight examples for each of the following situations:

- a grass for city lawns

  Kentucky bluegrass

- a rich forage to make hay for dairy cattle

  Alfalfa

- a grass to cover soil in a dry area to be used only for grazing

  Ryegrass

- a forage for an area with cool, short summers, and lots of rainfall

  Clover

- a legume for grazing that does not cause bloat as other legumes sometimes do

  Sainfoin

- a forage for horses

  Timothy

- a drought-resistant grass for grazing

  Crested wheatgrass or Smooth bromegrass

Students may have chosen an alternate grass for some of their answers. In these cases discuss these answers with the students to see why they would prefer the grass they selected, instead of the suggested answer.

Enrichment B

1. Visit a cattle auction or bull sale to find out what a cattle buyer looks for in a beef animal.

2. On some of your notepaper, record the prices paid for bulls of different breeds. Try to find the reasons for some of the price differences. Be prepared for a shock: bulls can be very expensive animals.

If students choose to do Enrichment B, discuss their trip to the auction and the reasons for price differences, if any, between animals of different breeds.

Enrichment C

Research one type of disease that can affect a farm animal or pet. Write a report which includes

- symptoms
- causes
- treatment
- prevention

Answers will vary, depending on the type of disease researched and the type of animal affected by the disease.

Note: The student should now complete both Parts A and B of the assignment for Section 2 in the Module 3 Assignment Booklet.

Student Animal Project

This is a good time for students to start an animal project. They should turn to Section 5: An Animal Project and select a project that interests them. Some guidance and help will be required in the activities related to the project. It is recommended that the learning facilitator preview the information in Section 5 in order to better assist the student. The remaining sections of this module can be completed concurrently with their project.

Note: Section 5: An Animal Project is to be done only by those students who have already completed Agriculture: Land and Life Year One. Students who have started directly into the Year Two program without doing the Year One program of Agriculture: Land and Life do not need to do Section 5. They should continue now with Section 3.

Section 3: On the Farm

This section gives students who do not live on a farm exposure to several types of farm operations. For people who live on farms, it is an opportunity to analyse their own surroundings and make comparisons with other types of farming and livestock production.

Before students get into the actual activities for this section, they are asked to think of some objectives that they think farmers and ranchers might have about managing livestock operations.

Although there are many types of livestock operations, farmers and ranchers have some common objectives:

- They want to produce a healthy product that satisfies consumer demand.
- They want to make a profit from their investments.
- They want their farm to be a successful business.

Can you think of any other objectives that farmers and ranchers might have?

Answers will vary. Provide appropriate feedback. Sample answers follow:

- *increasing product quality*
- *increasing operating efficiency*
- *reducing costs*

Students should be encouraged to contact farmers or ranchers to discuss the objectives of their specific livestock operations.

Section 3: Activity 1

The following time line is a summary of what happens during the year on a beef cow and calf operation:

	– November
• winter feeding on hay, silage, and milled grain	
	– December
	– January
	– February
• calving	– March
	– April
• begin summer grazing	– May
• branding (also castration, vaccination, and dehorning)	– June
• breeding of one-year-old heifers	– July
• breeding of cows	
• haying	– August
• harvest	– September
• weaning of calves from cows	
• preconditioning of calves	– October
• separate bulls from cows	
• steers and heifers to feedlot	– November
• culled cattle for slaughter	– December
• begin winter feeding	

1. With the aid of the previous chart, write a story about a steer or a replacement heifer from its birth. Include a description of the main people, animals, and events in its life.

   Answers will vary. Use the previous time line to help verify the sequence of events when you check and discuss student compositions.

2. Make a time line in the following space to show the events in lamb production over the course of a year.

• *breeding*	– *August*
	– *September*
	– *October*
	– *November*
	– *December*
• *lambing*	– *January*
• *tails docked*	– *February*
	– *March*
	– *April*
• *lambs to market* • *shearing sheep*	– *May*

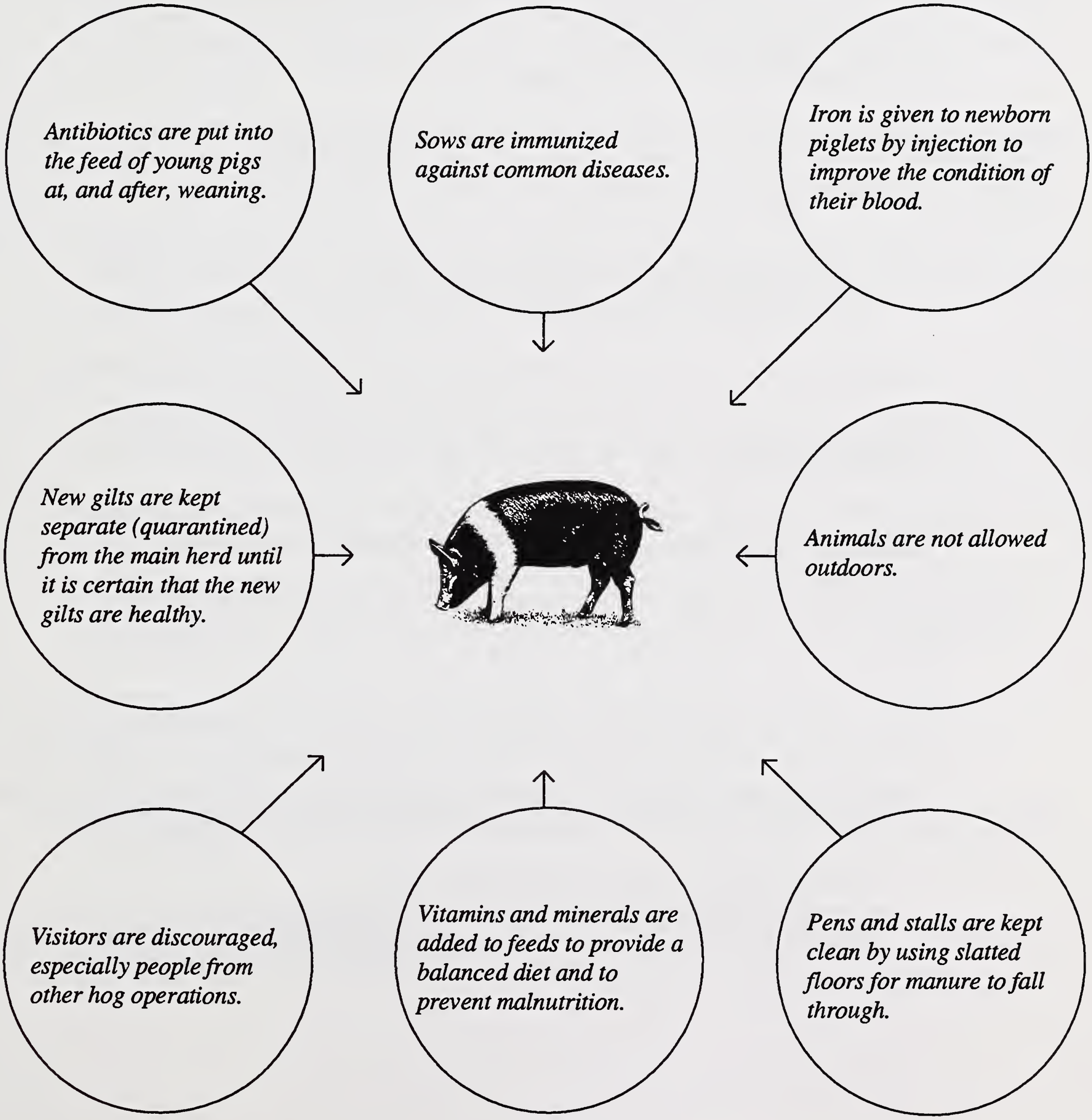
This time line is a chart of a season of lamb production on the Hughes' ranch. Other operators may schedule breeding and lambing at different times of the year. Check student charts for the length of time between the five events.

Section 3: Activity 2

1. What method of feeding sows appeals to you? Why?

   Answers will vary. Discuss answers with the students.

2. In the empty balloons that follow write all of the things that a hog farmer does to ensure the health of his animals. Include things dealing with feeding, environment, and immunization.



Antibiotics are put into the feed of young pigs at, and after, weaning.

Sows are immunized against common diseases.

Iron is given to newborn piglets by injection to improve the condition of their blood.

New gilts are kept separate (quarantined) from the main herd until it is certain that the new gilts are healthy.

Animals are not allowed outdoors.

Visitors are discouraged, especially people from other hog operations.

Vitamins and minerals are added to feeds to provide a balanced diet and to prevent malnutrition.

Pens and stalls are kept clean by using slatted floors for manure to fall through.

Section 3: Activity 3

If students plan to tour a farm that they do not live on, it is recommended that the parent, guardian, or other responsible adult accompany them on the trip.

1. Identify farm procedures which are involved in

   a. the production of new animals
   b. the production of animal feed
   c. the finishing of animals for slaughter

   Answers for a. to c. will vary. Look for completeness and responses that are on the topic.

2. Identify the methods that are used to

   a. improve the quality of the livestock
   b. improve the growth rate of young and older animals
   c. guarantee the health of the animals

   Answers for a. to c. will vary. Look for completeness and responses that are on the topic.

Section 3: Activity 4

Students are asked to complete two of the following three parts of Activity 4.

Part 1

Part 1 looks at the issue of factory farming. An example regarding the chicken industry is described in the Student Module Booklet but the questions raised can also apply to other livestock operations. Efficient operations are important but so is the welfare of the animals. In examining the issue of factory farming, students are asked to consider such items as

- **Is this farming or a type of food manufacturing?**
- **Can farmers use confinement-rearing methods humanely?**
- **How far would farmers be prepared to go to have an efficient livestock operation?**

In the following space include your answers to the previous questions as you discuss the issue of "factory farming." State how far you would be prepared to go in order to have an efficient livestock operation.

Students are to discuss their answers with the learning facilitator.

Answers will vary. This is a controversial issue with no precise answers. Perhaps the best answer to the issue of factory farming is that farmers who care about their animals should treat them in as humane a manner as the situation will allow. For example, lighting and temperature are adjusted in confinement areas to calm the animals, the animals should not be frightened unnecessarily. The example regarding the chicken industry that was described in the Student Module Booklet indicated that chickens that live in battery cages can die of heart failure if they are overstimulated.

Although confinement is not normal, it cannot be considered cruel if proper consideration is given for animal welfare. Researchers are investigating ways to relieve psychological stress among animals such as that indicated by feather picking and cannibalism among chickens raised in battery cages.

These factory farming methods have been adopted to help farmers become more efficient food producers. There is, however, a human factor which sets limits on how far this process can go: this is farming. There are no such restrictions in a factory.

Part 2

Growth in humans and animals is triggered by hormones produced in the body. Scientists have known for some time that faster growth is the result of increased hormone production.

Some livestock producers now use this principle to their advantage. By stimulating hormone production, a higher rate of growth can be achieved.

This hormone-implanting method has been approved by Health and Welfare Canada, the World Health Organization, and the United States Food and Drug Administration. In spite of this the method does not appeal to consumers. Why is this so? What should beef producers do?

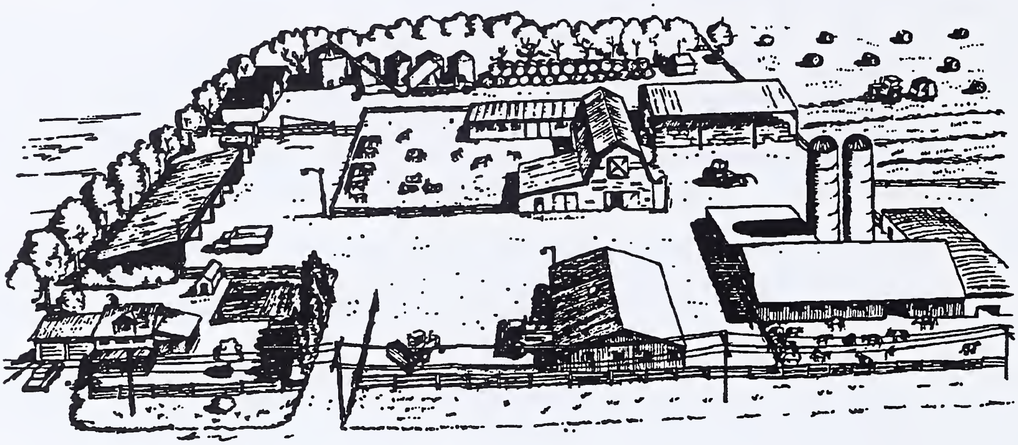
Write your answer here. Include additional information from library research on this topic if you wish.

Consumers resent this hormone-implanting method mainly due to a misunderstanding. This method is an artificial stimulation of a natural growth process. There is also a trend among consumers for "natural" foods.

The only solution for livestock producers is to ensure that guidelines for use are followed, and that the public is well informed about its use.

Part 3

Examine the following farm graphic. Find and (in the space below the graphic) name the machines that help livestock producers. Remember that many machines are small and can be found inside buildings.



The following are a few machines that students may have identified:

- *loaders for moving bales or manure piles, and mixing feeds*
- *tractors for pulling farm machinery such as tillage equipment, balers, sprayers, and manure spreaders*
- *augers for moving grain and prepared feeds*
- *compressors for pneumatic grain-moving systems*
- *computers for bookkeeping and programmed feeding systems*
- *feed mills for grinding and crushing feeds*
- *electric motors for fans, pumps, and compressors*

Section 3: Activity 5

Many people help to produce meat from livestock. On the line beneath each illustration, name the person or persons pictured.

1. *veterinarian*
2. *auctioneer*
3. *truck driver*
4. *banker*

5. *railroader*
6. *meat packer or grocery store personnel*
7. *restaurant owner*
8. *farm equipment dealer*
9. *farmer or rancher*
10. *researcher*
11. *construction worker*
12. *feedlot operator*
13. *butcher*

14. Place each person or persons named in the previous illustrations into one or more of the following categories.

Producer	*farmer, rancher, feedlot operator*
Supplier	*farm equipment dealer*
Services	*veterinarian, researcher, truck driver, railroader, auctioneer, banker, construction worker*
Processor	*meat packer, butcher*
Sales	*grocery store personnel, restaurant owner*

Section 3: Follow-Up Activities

Extra Help

Students are to use the words given in a word list in the Student Module Booklet to fill in the blank spaces.

The first milk that an animal receives is called *colostrum*. Preparing a calf for life in a feedlot is called *preconditioning*. This reduces losses from *stress* on the animal caused by the move to the feedlot. The feeding of a weaned animal to market weight is called *finishing*.

Giving birth to a litter of piglets is called *farrowing*. The mother pig is called a *sow* and the father is the *boar*.

Because so many animals live in such a small space, hog farmers must take care to prevent *diseases*. New animals are *quarantined* before they are allowed to join the main herd. Sows are *immunized* against some common diseases. *Antibiotics* are added to feeds given to piglets and young pigs.

Indoor confinement also helps to prevent disease, but it creates *social problems* for the animals. *Computerized feeding systems* have been used to allow indoor animals more movement and a normal social atmosphere.

Today's livestock producers have become more efficient by using such things as *confinement rearing*, *growth hormones*, and modern *machinery*.

Many people are involved in the production of livestock and meat. Farmers are the *producers* of livestock. They rely on people such as farm equipment dealers and veterinarians for *supplies* and *services*. Livestock is *processed* into different meats and animal by-products. Still other people *market* these products to you.

Enrichment

Students are encouraged to complete two of the following three activities.

Enrichment A

1. Suppose you live on an acreage with four hectares of pasture. Land in the area is rated at 0.5 hectares per AUM.

   a. How long can you graze one horse on the land before it is overgrazed?

   0.5 hectares of the acreage yields 1 AUM. So four hectares will yield

   $$\frac{4 \text{ hectares}}{0.5 \text{ hectares / AUM}} = 8 \text{ AUM of feed}$$

   You could graze your horse on four hectares of pasture for eight months.

   b. If you purchase two tonnes of hay, how long will this feed your horse? (Remember that 1 AUM = 11.8 kg/day)

   The feed would last $\frac{2000 \text{ kg}}{11.8 \text{ kg / day}} = 169$ *days.*

2. Farmer Jones is concerned that deer are eating too much of the native grassland pasture. A herd of 20 animals has been around most of the month. This land is rated at two hectares per AUM.

   a. How many cattle could be fed on the grass that is being eaten by the deer?

   Five deer eat one AUM
   or twenty deer eat four AUM,
   but four cattle eat four AUM as well.

   Therefore, four cattle could be fed on the same grass.

b. How much of this land is used to support the deer?

Each AUM requires two hectares.
Four AUM requires eight hectares.

The deer would require eight hectares for grazing each month.

c. Should Farmer Jones be concerned? Explain.

Farmer Jones may be concerned, particularly if the deer stay all summer! On the other hand, there may be a feeling of responsibility to provide a wildlife habitat. The deer can be controlled by hunters if they become too numerous.

3. Martha lives on a quarter-section of land west of Red Deer, which includes 64 hectares of pasture. Similar land in the area is rated at 0.5 hectares per AUM.

   How many sheep (ewes) could be grazed on this land over six months of summer?

$$\begin{aligned}\textit{Total amount of forage} &= \frac{64 \textit{ hectares}}{0.5 \textit{ hectares / AUM}} \\ &= 128 \textit{ AUM}\end{aligned}$$

If five ewes require 1 AUM,
total ewes = 5 × 128 or 640 ewes for one month.

$$\begin{aligned}\textit{Since the ewes will be grazing over six months, the actual number of ewes} &= \frac{640}{6} \\ &= 107 \textit{ ewes.}\end{aligned}$$

Enrichment B

The feedlot finishing of cattle is a high-risk business. It takes a lot of money to buy feeder cattle and feed. The prices of feed, feeder cattle, and finished cattle are hard to predict. Losses from disease, injury, and bloat can be serious.

An owner often asks: "Will I make any money?"

In this activity students will ask the same question. Because this business is a bit of a gamble, they will use dice to determine costs and prices.

The Game

With a herd of 100 feeder cattle (average weigh 200 kg) you will try to make money by feeding them to the market weight of 450 kg.

Note: Students will pick their own solutions by rolling the dice. The sample solution presented here has assumed the mean values for all variables.

Step 1: What are your replacement costs?

Roll the die to find the cost of each steer and heifer. Then find the average cost for the herd, assuming there are equal numbers of steers and heifers.

For this sample solution assume an average replacement cost of $505.

Step 2: What are your feed costs?

Roll the die to determine your feed prices. When you have determined the price, enter it into the table below Cost of feed in $ per tonne. Then calculate the Cost of feed per head ($) and Total feed costs per head using the table.

Based on average feed costs, the Total feed costs per head will be $214.71. This amount will be used for this sample solution.

Step 3: What are your stock losses?

For this sample solution, the stock loss is assumed to be 2%, or two animals out of 100.

Step 4: Other things that cost

We are assuming an average other cost of $50 per head for this step.

Step 5: What is the average final weight?

For this step we are assuming an average final weight of 475 kg.

Step 6: If the price is right . . .

For this step we assume an average price of $185. This will make the average value for a finished animal

$$\text{Average value} = \frac{\text{Average Price / kg} \times \text{Average Final Weight}}{100}$$

$$\frac{185.00/kg \times 475\ kg}{100} = \$878.75$$

Step 7: Let's see how well you have done!

Use the figures you have determined in Step 1 to Step 6

Costs

average replacement cost per head	$ 505.00
+ feed costs per head	$ 214.71
+ other costs per head	50.00
= average cost per head	$ 769.71
× number of cattle at start	× 100
= TOTAL COSTS	**$ 76 971.00**

Income

original cattle	100
– losses	– 2
= remaining cattle	98
× average value	$ 878.75
= TOTAL INCOME	**$ 86 117.50**

Your profit equals total income – total costs.

PROFIT =

In this example PROFIT = $86 117.50 – $76 971.00 = $9146.50.

Some money was made using the average values for all variables in this sample solution. Try the same game using several students. Who will make the most money?

Be sure to check student calculations. Depending on the rolls of the dice, some students will make money while others will lose.

It may be appropriate to arrange for a feedlot operator to visit and discuss the feedlot business with the students. A comparison between the students' question results and the feedlot operation would be interesting.

Enrichment C

Now it is your turn. Design a brand to identify your cattle. A brand is a part of the family history of many Alberta ranches.

Answers will vary. Show an interest in students' designs. Check to see that the rules listed in the Student Module Booklet are followed.

Note: The student should now complete the assignment for Section 3 in the Module 3 Assignment Booklet.

Section 4: Making the Most of Meat

This section traces the path of meat from farm to table and examines the important steps along the way. In the process, students will gain an appreciation of the contributions that livestock make to their personal, economic, and social well-being.

Section 4: Activity 1

1. Compare the three marketing systems using the following table.

	Private Sales or Public Auction	Producer-Owned Cooperatives	Marketing Board
Which system will show the most or least variation in prices?	*Prices will vary continuously.*	*Prices will vary but producers will receive the average daily price.*	*Prices are fixed within certain limits which may vary over longer periods of time.*
Which system allows producers to search for the highest price?	*In the short term, the highest prices will be paid in this system.*	*Some producers benefit more than do others from this system. Not all producers are close to markets.*	*Lower but steadier prices will be found in this system.*
Do any of these methods control prices?	*no*	*no*	*no*
Do any of these methods control the amount of supply?	*no*	*no*	*Yes. Supply is controlled by quotas to an oversupply which would make prices drop.*
Rate the amount of risk in each system from least to most.	*There is a high risk of falling prices.*	*There is a moderate risk of a long-term price drop.*	*There is a low risk of loss due to falling prices.*

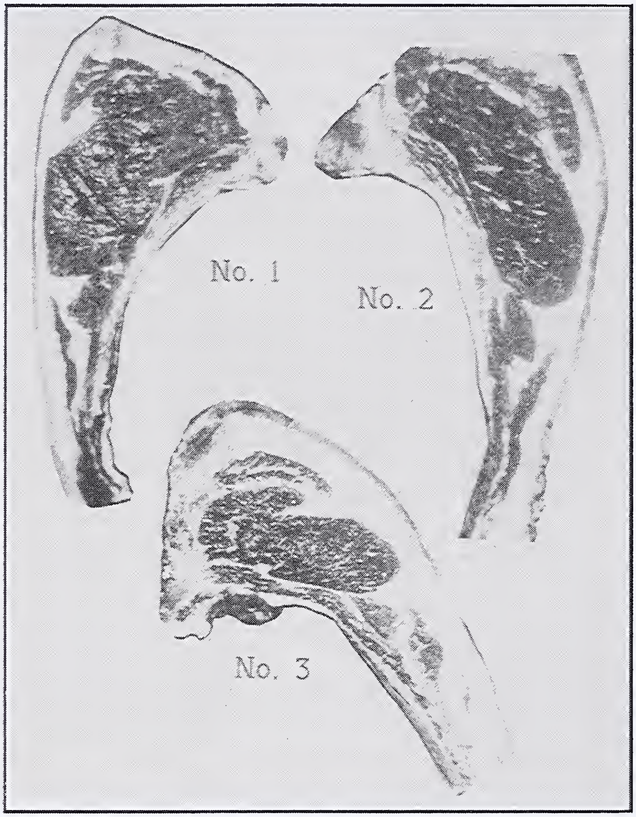
2. Which system would you prefer? Explain the reasons for your answer in the space below.

Answers will vary. Discuss student ideas.

Do not expect a detailed answer. As consumers, many people would favour a system such as a public auction that would produce bargains when supplies are high. Other people would prefer a system that produces steady prices.

Section 4: Activity 2

Based on the grading system for beef, identify the following steaks as grade A1, B1, or B4. Explain the reasons for your choices.



No 1: Grade *A1*

Reason: *This has a fine texture, and a reasonable fat cover. It is also well marbled.*

No 2: Grade *B1*

Reason: *This has little fat but no marbling, and a coarse texture.*

No 3: Grade *B4*

Reason: *This cut has too much fat.*

Section 4: Activity 3

1. Turn to the diagrams of meat carcasses at the end of the Appendix.

   How many prime cuts are shown for each animal?

   Beef *7* Pork *4*

   Veal *4* Lamb *4*

2. Why are there more prime cuts in large animals?

   Prime cuts reduce the weight that must be handled. Smaller animals need fewer prime cuts.

3. Trace the path of the following products on the flow chart, located on the following page. Use a different colour for each product:

   - a steak dinner in a hotel restaurant
   - bulk boxed ground beef for the school picnic
   - locally made farmers' sausage
   - a pork chop at a supermarket
   - a leather handbag

   Answers will vary.

Check student answers for a logical pathway. Final cutting is most often done at a local market, supermarket, or restaurant. A leather handbag would be manufactured from hide which is a by-product of Meat Sector Processing.

4. Test yourself by filling in the following chart.

   Place a ✔ in the box below the type of meat that would produce the cuts listed. Please note that there may be as many as four ✔'s for each cut of meat.

	Beef	Pork	Lamb	Veal
cutlets		✓		✓
round steak	✓			
spareribs	✓	✓		
short ribs	✓			
stew meat	✓	✓	✓	✓
ground meat	✓	✓	✓	✓
sausage	✓	✓	✓	✓
bacon		✓		
prime rib roast	✓			
kidney	✓	✓	✓	✓
ham		✓		
leg roast		✓	✓	✓
sirloin steak	✓			✓
chops		✓	✓	
tenderloin	✓	✓		✓
rolled roast	✓	✓	✓	✓
hocks		✓		

The answers are also included in the Appendix of the Student Module Booklet.

5. Are there some cuts not mentioned? List five other meat cuts and the type of animals that they come from.

   Students can check their own answers to question 5 by using information given in the Meat Cuts section at the end of the Appendix in the Student Module Booklet.

6. Under the following headings, write down the main by-products of these items, and some of the things they are used for.

Bones/Hooves	**Hide/Hair**	**Glands**	**Tallow (fat)**
gelatin	***leather***	***pharmaceuticals***	***glycerin***
ice cream	*wallets*		*lipstick*
glue	*shoes*		*soap*
marshmallows	*purses*		*toothpaste*
			explosives

A list of some pharmaceuticals made from cattle is included in Enrichment B.

Section 4: Activity 4

1. Visit your local grocery store and record the Best Before dates for the following products.

Note: Look for labels that say **vacuum packed** and underline them in your table.

Today's Date is ____________________

	Best Before	Store Shelf Life	Normal Shelf Life
steak			3 – 4 days
ground beef			2 days
pork chop			3 – 4 days
fresh pork sausage			2 days
luncheon meats			4 days

Circle any meats that seem to be outdated. Then read on to find out if this is okay.

Answers will vary. Researching shelf life may produce some surprises. For example, vacuum-packaging extends the shelf life of meats. Preservatives may also be used for prepared luncheon meats.

2. The following table lists the common methods used to preserve meats. Use what you have just learned about enzymes, oxygen, and bacteria to match each lettered method with the best description on the right side of the table. Match letters to the corresponding definitions; place letters on the lines to the left of the definitions.

Note: If you need more information, you can find it in most encyclopedias under the topic "Food Processing."

METHODS TO PRESERVE MEATS

a. vacuum packaging
b. cellophane wrap
c. canning
d. refrigeration
e. freezing
f. drying
g. smoking
h. pickling
i. adding preservatives
j. pasteurization
k. cooking
l. irradiation

e uses very cold temperatures to slow the action of enzymes and oxygen, and the growth of bacteria

b reduces the exposure to oxygen to prevent discolouration

f removes moisture to prevent the growth of bacteria (but does not kill bacteria)

d uses lower temperatures to slow the growth of bacteria and molds

c kills most bacteria by cooking, and prevents the growth of bacteria by removing the oxygen supply

a prevents growth by removing oxygen and replacing it with a gas that bacteria do not like

l kills bacteria with penetrating rays of energy

g adds a pleasing flavour to the meat, and creates substances in the meat that prevent the growth of bacteria

i substances are added to precooked meats to slow the growth of bacteria and to reduce enzyme activity

h creates a very acidic environment that bacteria do not like

j kills most bacteria in milk with low heat

k kills bacteria with high heat

Section 4: Activity 5

1. Describe package features that would appeal to the meat consumer.

   Package features should be visible, clean, and informative. As well, the price, weight, and grade should be clearly marked.

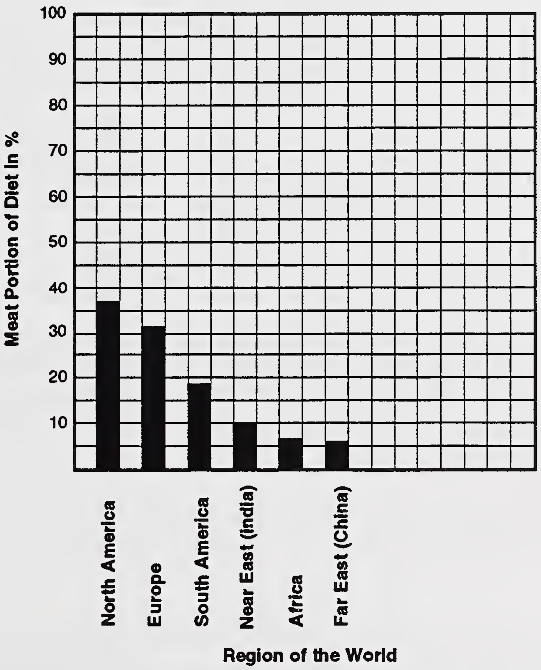
2. Outline the information found on the package.

   Students should identify the price per weight, the weight, the type of cut, and the best before date.

Section 4: Activity 6

1. Draw a bar graph using the values just given. Be sure to include the appropriate labels to complete the graph.

PROPORTION OF MEAT IN DIETS AROUND THE WORLD
(as % of total calorie intake)



Answers should reflect the outlined percentages.

2. Some people argue that meat is a food people don't need. They say meat production wastes farmland.

   Other people maintain that meat is a wholesome food that all should have. They say meat is produced on land that is not suitable for conventional farming.

   Who is correct? Write your opinion. Give reasons for your opinion from information collected in this module or from elsewhere.

   Answers will vary but should include ideas from this module.

3. Now read "Arguments For and Against Meat" in the Appendix. You may also wish to gather further information on the topic from other reference materials. Who do you think is right now? Has the additional reading caused you to change your mind? If so, why?

   Answers will vary. For reference, the pro and con arguments are reprinted here from the Appendix of the Student Module Booklet.

Pro Meat Arguments

Meat is a convenient and nutritious food rich in proteins, minerals, and energy. Meat is a source of complete proteins, and it adds variety to people's diets. Meat animals provide humans with many valuable by-products. Many people find employment in meat-related industries.

Meats are mainly produced by ruminant animals that can survive on nondigestible vegetable fibres. As a result meat animals make use of all the plant, rather than just the seed portion. Ruminants can obtain nutrients from land that is not suited for conventional farming.

Meat animals can eat surplus grain; it is difficult to sell Canada's total grain harvest in most years. Livestock also provide an alternative source of income for farmers. Unlike grain crops, there are no government subsidies for livestock production.

Con Meat Arguments

Meat is an expensive food to produce. One kilogram of meat requires almost 10 kg of feed to produce it. Much of this feed comes from cultivated forages grown on land that could produce grain or vegetable crops for humans. In some parts of the world large areas of farmland are held by individuals and used for the production of meat for export. This lessens the amount of land available to produce food for local people.

Many meat animals are raised under conditions that cause extreme physical and mental hardship. Confinement rearing of poultry, hogs, and calves is done for efficient production at a cost to animal welfare.

Meats are rich in fats, which are substances that have been linked to heart disease and intestinal cancer. The average North American consumes more meat than is needed for nutrition alone.

4. What is Canada's most popular meat?

   Beef is Canada's most popular meat.

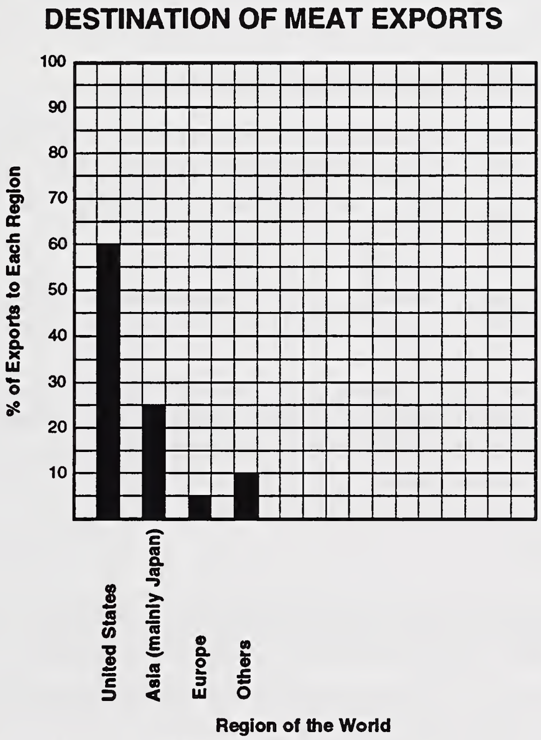
5. Chicken consumption per person in Canada increased from 17 kg per year in 1973 to 20 kg per year in 1986, while beef consumption decreased. Much of this change has to do with the price of chicken compared to red meat. Try to explain why chicken is becoming so popular.

   The store prices of chicken are lower than most meat cuts. There is also a perception among many consumers that white meats (such as chicken) have less fat and less cholesterol than red meats (such as beef).

6. What are the advantages Alberta has over other parts of Canada when it comes to meat production?

Alberta has an abundance of grazing land and a good supply of low-cost feed. Alberta normally has enough water, but if there is a weak link in the chain, this is it!

7. Use these values to construct a bar graph to show where Canada's meat exports go. Be sure to include necessary labels.



Answers should reflect the outlined percentages.

Section 4: Follow-Up Activities

Extra Help

As a review of this section you are asked to write an autobiography of one of the following: a pork chop, a hamburger pattie, a beef steak, or a chicken leg. Include a description of all the things that happen to you as you go from farm to table.

Answers to this activity will vary. To evaluate student answers, use the chart in the Student Module Booklet, which shows the path followed by meat from farm to table and the major stops along the way.

Enrichment

Enrichment A

Consider the following dilemma:

Bison in Wood Buffalo National Park in Northern Alberta are infected with tuberculosis. As human settlement comes closer to the park, Agriculture Canada presses for a total slaughter of all bison to protect cattle from this disease; Agriculture Canada says there is no other way to eliminate the disease from this herd.

Which of the following should the government do?

- Slaughter the herd and repopulate the area with "clean" buffalo.
- Limit settlement in the area and isolate the buffalo herd until a better solution can be found.

What do you think? Write your answer here.

Answers will vary. In all cases, however, it is hoped that students will see the value in protecting the livestock industry.

Students should discuss their answer with the learning facilitator or another interested adult.

Enrichment B

See for Yourself: Use the information presented to make a list of some of the illnesses and health needs that can be helped with medications made from animals.

Answers will vary. Some of the illnesses and health needs that can be helped with medications made from animals include the following:

- *sugar diabetes*
- *burns*
- *frostbite*
- *blood clotting*
- *thyroid problems*
- *bleeding (no clotting agent)*
- *allergies (hay fever and asthma)*
- *anemia (thin blood)*
- *leukemia*
- *milk digestion*
- *bases for skin creams and nonprescription medications*

Enrichment C

1. Why would people in other countries want to buy the semen or embryos of Canadian livestock? Why would they want to purchase livestock from Canada?

   People in other countries want productive herds, but do not have the long history of breed development that is available in Canada and other countries. Importing the semen and embryos of Canadian livestock are ways that productive herds can be quickly achieved.

2. Why is the prevention of disease among Canadian livestock so important?

   Canada's reputation as a reliable source of quality livestock depends on a disease-free product – this is also a factor in meat exports.

Note: 1. The student should now complete both Part A and Part B of the assignment for Section 4 in the Module 3 Assignment Booklet.

2. Check to see that all assignments have been completed and that all written work is done neatly in blue or black ink. Diagrams may be left in pencil.

3. The completed Assignment Booklet for Module 3 should now be submitted to the Alberta Distance Learning Centre for correction. The assignments for Section 5: An Animal Project are evaluated as part of Module 4.

Section 5: An Animal Project

Student projects are included in the Agriculture: Land and Life Year Two course to give students a chance to pursue personal interests. A choice of animal projects has been included to enable students to learn more about animals and livestock. For this project students can raise a farm animal or they may use the project as an opportunity to test ideas and answer questions about livestock or about how farming can affect wildlife habitats. Whatever the reason, a key part of the project experience should be enjoyment. Students should choose something that they would like to do.

Note: Section 5: An Animal Project is to be done only by those students who have previously completed Agriculture: Land and Life Year One. If this course is the student's first enrolment in the Agriculture: Land and Life program, then the project is to be omitted – Part A: What Is Agriculture? in Module 4 will need to be done instead.

The type of project that students select will vary. As a result not all of the activities in Section 5 are critical to the completion of any one individual project. The activities in Section 5 are included to assist students with the planning and completing of assignments regarding the animal project in the Module 4 Assignment Booklet.

Section 5: Activity 1

Students should use this activity to select an animal project and set reasonable objectives for the project.

1. What type of project would you like to do? Write your thoughts here.

   Answers to this question will vary. If students are not able to raise an animal in their present situation, they can research a particular animal.

2. Write down your choice of animal.

   Answers will vary. At this stage students are only in the preliminary planning stages. Later, when students have made a decision about what type of project to do, they will check and discuss their plans with the learning facilitator.

3. Now it is time to make decisions. Have you read all of the project suggestions? Which project and which animal would you like to work on?

Before students begin actual work on their projects they should become familiar with the parts of this project. The instructions for various projects are given in the Student Module Booklet, but the assignments that students need to do for the animal project are located in Part B of the Module 4 Assignment Booklet. This allows students time to work on their projects while continuing to work on other modules.

Students will read through the list of project ideas to select their project, and it is recommended that learning facilitators also read through the list to gain insights, and to ensure that choices are achievable within the scope of each project. Students have a choice of four projects:

- **Project A: Animal Care**
- **Project B: Animal Study**
- **Project C: Wildlife Management**
- **Project D: Trapping and Conservation**

After discussing plans with their learning facilitator, students will complete Project 2: Assignment 1 in Part B of their Module 4 Assignment Booklet.

Section 5: Activity 2

Students should use this activity to gather and organize information about their project. It is recommended that the learning facilitator also read the information listed under "Where to Look:" in the Student Module Booklet, to assist students in locating some of the reference materials. Encourage the students to use a variety of information sources.

Students will now complete Project 2: Assignment 2 in Part B of their Module 4 Assignment Booklet.

Section 5: Activity 3

This activity and the assignment for this activity will help students plan each step of their project. Again it is recommended that the learning facilitator preview the information in the Student Module Booklet for this activity in order to better assist the student.

If you plan to raise an animal , answer the following questions about housing.

1. How much area is required for sleeping or grazing?

   Many books will give the recommended size required for caged birds. See also Section 2: Activity 3 in the Student Module Booklet for the space required by different livestock animals.

2. What type of shelter is needed?

   Many books will outline the recommended shelter needed for a variety of animals. See also Section 2: Activity 3.

3. What type of bedding should you use?

   Straw or wood chips are the most common types of bedding materials.

4. What type of feeding "furniture" is needed?

   Answers will vary, depending on the animal chosen for the project.

5. How will the housing be cleaned?

   Answers will vary. A shovel will most likely be used.

6. Locate the specifications of a high quality commercial feed for your animal. Identify the amount of each essential nutrient listed in the chart. Include this information in your report for your animal project in the Module 4 Assignment Booklet, as well as in the following chart.

Essential Nutrients	Amounts Listed in a Commercial Feed	Alternate Sources of Essential Nutrients
proteins		
carbohydrates		
fats		
minerals		
vitamins		
roughage (fibre)		
moisture (water)		

Specifications will vary depending on the commercial feed being used for the animal that is being raised or researched for the project.

7. In the previous chart provide an alternate source for each of the essential nutrient groups using a noncommercial blended feed.

   Note: Nutrients and vitamins may need to be added to some feed sources.

   Answers will vary.

8. Where do you plan to obtain feed for your animal?

   Answers will vary.

9. What type of habitat does your animal prefer?

   Answers will vary. If the project involves the study of wild animals, the students should include biotic factors (food sources and predators) and abiotic factors (climate, landforms, and other physical features of habitat).

Students will now complete Project 2: Assignment 3 in Part B of their Module 4 Assignment Booklet. They should answer only the questions for Project A, B, C, or D, depending on what project they are doing.

Section 5: Activity 4

When raising an animal, people must learn to recognize signs of illness or disease. When caring for wild animals, people must recognize signs of poor health and problems with the animal's habitat.

In Activity 4 and Part B: Project 2 – Assignment 4 of the Module 4 Assignment Booklet, students will apply the information that they have gathered to

- **care for an animal**
- **prepare a report**
- **examine and plan a wildlife habitat**

The learning facilitator should preview the information in the Student Module Booklet for this activity to better assist students.

What is Normal? What is Not?
Here are some normal rates for various animals.

1. If you plan to raise an animal, fill in the bottom line of this chart with the normal temperature, pulse, and respiration rate for your animal.

Animal	Temperature °C (°F)	Pulse and Heart Rate (beats/min)	Respiration (breathing) Rate (breaths/min)
horse	37.7 (100.0)	30 – 34	8 – 16
cattle	38.3 (101.0)	60 – 70	10 – 30
pig	39.2 (102.5)	60 – 80	8 – 18
sheep	39.1 (102.3)	70 – 80	12 – 20
dog	38.9 (102.0)	70 – 120	10 – 30
cat	38.6 (101.5)	110 – 130	20 – 30
your animal?			

Students may need to do some research to obtain this information. Students should not attempt to take the temperature of an animal without supervision from a veterinarian or another experienced adult. A phone call to a veterinarian will also produce this information for normal animals.

2. a. List the most common diseases for your animal.

   b. What are the common symptoms of each disease?

   c. How is each disease prevented and treated?

Answers will vary. The diseases named will depend on the animal selected for the project. To check the symptoms of each disease, and how each disease is prevented and treated, the learning facilitator may need to refer to reference books on animal diseases.

The following is an incomplete list of diseases in some types of animals.

Dogs
Canine distemper
Canine hepatitis
Canine heartworm infection
Canine parvoviral infection

Cats
Feline distemper
Feline calicivirus
Feline pneumonia

Swine
Erysipelis
Transmissible gastroenteritis
Swine dysentery

Sheep
Scabies
Enterotoxemia
Ovine vibriosis

Cattle
Respiratory disease
Blackleg
Leptospirosis
Brucellosis

Horses
Equine distemper
Equine encephalomyelitis
Tetanus

3. List the common parasites that might be found on your animal.

Answers will vary. Here is an incomplete list of common animal parasites.

Flies and mosquitoes
Horse bots
Lice
Ticks
Cattle grubs
Fleas
Mites
Wool maggots

Students may visit a veterinarian to discuss animal diseases. The veterinarian may also be interested in visiting the students to talk about animal diseases, and other topics.

Students will now complete Project 2: Assignment 4 in Part B of their Module 4 Assignment Booklet. They should answer only the questions for Project A, B, C, or D, depending on what project they are doing.

Section 5: Activity 5

Students should read the information in the Student Module Booklet to prepare for the Activity 5 assignment. In addition, they will need to do some research. Students should now complete Project 2: Assignment 5 in Part B of their Module 4 Assignment Booklet. Students should answer only the questions that apply to their project.

Section 5: Activity 6

Students should read the information in the Student Module Booklet for Activity 6, then complete Project 2: Assignment 6 in Part B of their Module 4 Assignment Booklet. If all the assignments for both Project 1: A Plant Project and Project 2: An Animal Project have been completed, then Part B of the Module 4 Assignment Booklet should now be submitted to the Alberta Distance Learning Centre for correction. Students should include Page 2 containing FOR TEACHER'S USE ONLY, Part B Summary, when submitting Part B. Part A should not be submitted.

If all four modules of Agriculture: Land and Life Year Two have now been completed, please have the course survey, found at the end of the Module 4 Student Support Guide, completed and return it with the Module 4 Assignment Booklet.

Agriculture Year 2

9AG07P63

L.R.D.C.
Producer

FIRST EDITION
1992